United States Patent [19]

Lindsey

[11] **3,831,806**

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[54] **VENDING MACHINE HAVING PRODUCT LEVEL SENSING SWITCH AND METHOD OF CONVERSION OF MULTI-COLUMN VENDING MACHINES FOR CONJOINT OPERATION OF AT LEAST TWO COLUMNS**

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[52] **U.S. Cl.** **221/1,** 221/14, 221/129

[51] **Int. Cl.** **G07f 11/10**

[58] **Field of Search** 221/10, 11, 13, 14, 129, 221/124, 1

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[57] **ABSTRACT**

A coin operated multi-column vending machine embodies a separate product delivery means for each column of product units and associated circuit components including plural customer-operated product selector switches. One such selector switch is removed from a customary circuit and two product unit columns are placed under control of a product level sensing switch and one selector switch for conjoint operation. The product level sensing switch is mounted approximately midway of one of the two product unit columns and is electrically connected in the control circuit to respond to product depletion in said one column of the connected pair of columns to a predetermined level in the column and transfer dispensing control to the second column of the connected pair. Selective product dispensing from the second column is continued until the second column is empty. Thereafter, despensing control is automatically transferred back to the first column and the remaining product units in the first column are selectively dispensed until the products in that column are fully depleted. The invention is particularly applicable to vending machines for dispensing carbonated soft drinks or other food products which are subject to staleness if left too long in the machine. The invention allows for easy modification and conversion of existing multi column vending machines and their associated control circuits in the field.

14 Claims, 2 Drawing Figures

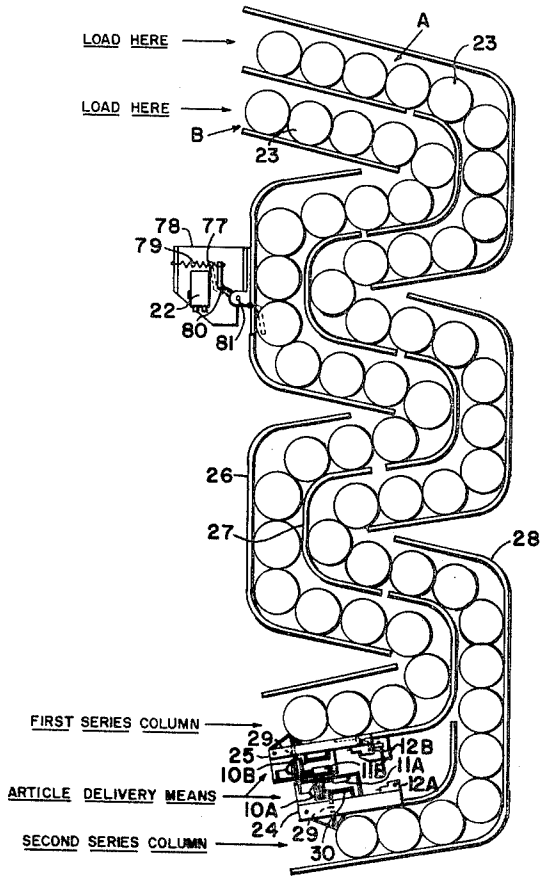


FIG. 1

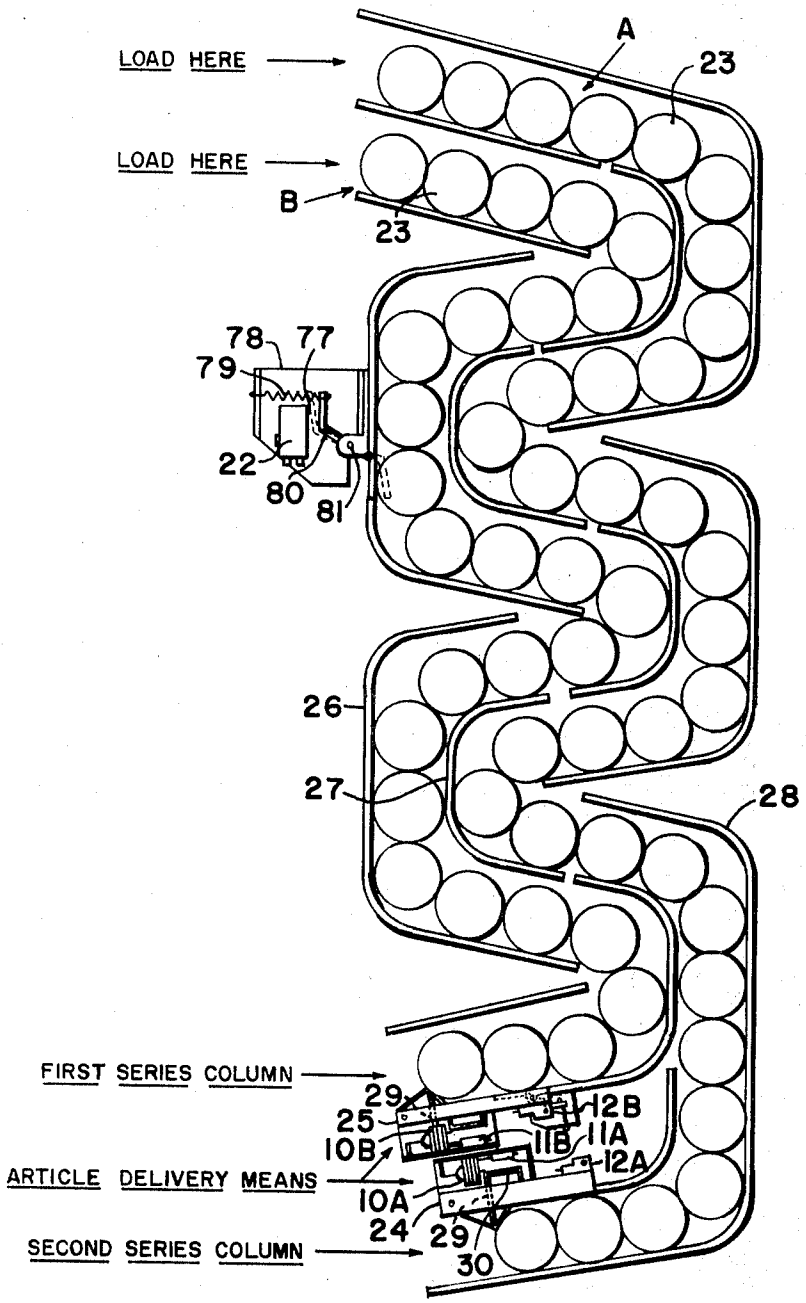
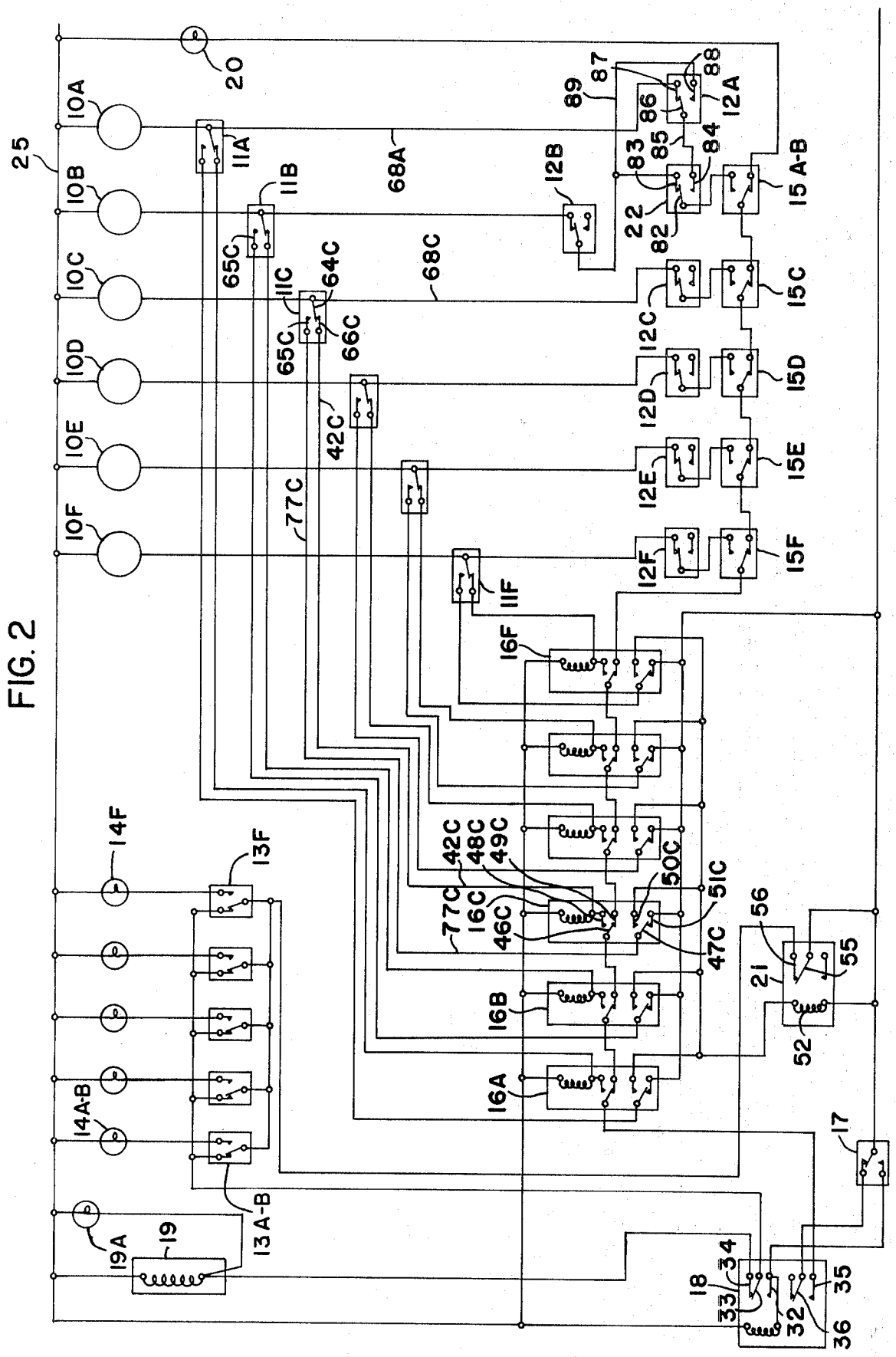

LOAD HERE
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A
B
23
23
78
77
79
22
80
81
26
27
28
FIRST SERIES COLUMN
ARTICLE DELIVERY MEANS
SECOND SERIES COLUMN
29
25
10B
10A
24
29
30
12B
11A
11B
12A

FIG. 2


20
25
10A
10B
10C
10D
10E
10F
11A
11B
11C
11F
12A
12B
12C
12D
12E
12F
13A-B
13F
14A-B
14F
15A-B
15C
15D
15E
15F
16A
16B
16C
16F
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19A
21
22
32
33
34
35
36
42C
46C
47C
48C
49C
50C
51C
52
55
56
64C
65C
66C
68A
68C
77C
82
83
84
85
86
87
88
89

VENDING MACHINE HAVING PRODUCT LEVEL SENSING SWITCH AND METHOD OF CONVERSION OF MULTI-COLUMN VENDING MACHINES FOR CONJOINT OPERATION OF AT LEAST TWO COLUMNS

BACKGROUND OF THE INVENTION

The prior art contains a number of disclosures relating to control circuits for coin operated multi-column vending machines for containers of soft drinks and like products. One such prior art disclosure is embodied in U.S. Pat. No. 3,349,881 issued to V. D. Camp on Oct. 31, 1967 for a VENDING MACHINE LOCKOUT CIRCUIT. A second example of the prior art is contained in U.S. Pat. No. 3,486,601 to Bowman issued on Dec. 30, 1969 for VENDING CYCLE LOCKOUT CIRCUIT. Still another example of the prior art is contained in U.S. Pat. No. 3,613,854, Bowman, issued Oct. 19, 1971 for CHECK CONTROL VEND RELAY TIMING CIRCUIT. In these prior art patents as well as others along similar lines, the main objective has been the provision of an economical control circuit to solve the problem of removing established credit at the proper times to insure delivery of only one product unit per established credit and thereby prevent "jackpotting" of the vending machine. Such circuits are frequently employed in coin operated vending machines for selectively dispensing articles one at a time, from a plurality of columns as exemplified in U.S. Pat. Nos. 3,107,812; 3,107,813, 3,224,631; 3,300,084; 3,348,733; 3,498,497 and 3,507,419. The present invention, while embodied in a vending machine and its associated control circuit of the type exemplified in the above-noted prior patents, is also applicable to other types of vending machines and associated control circuits.

In recent years, the trend in design of coin operated vending machines which handle food products is to increase the storage capability of the machine, while at the same time provide additional selection choices. Increased storage capability, however, means that products will be retained within the machine for longer periods. This problem is particularly acute in connection with food products or drinks which are subject to staleness on long standing. Thus, it is highly desirable to provide means for minimizing the storage time of products within a vending machine.

It should be apparent that from the standpoint of the manufacturer of vending equipment the cost of modifications to present equipment must be held to a minimum and it is preferable to avoid field modification where possible. However, utilization of the mechanical structure and control circuits already in widespread use is desirable and advantageous in some instances, particularly where the cost of retooling for production to manufacture completely new vending machine units is prohibitive.

It is therefore a primary object of the present invention to provide a vending machine which automatically switches dispensing control to a second column upon depletion of products in a first column.

Another object of the present invention is to enable modification of existing coin operated multi-column vending machines in a relatively simple and expeditious manner, which modification can be made conveniently and economically in the field.

More particularly, the invention relates to the provision of a product level sensing switch which is capable of responding to product unit depletion to a predetermined level in one vending column of a multi-column vend machine and automatically transferring dispensing control to a second column containing units of an identical product, such as containers of soft drinks of a single flavor stacked in two adjacent columns of the vending machine. When vending control has been transferred by the sensing switch to the second column of the associated pair, the product units in the second column will be selectively dispensed one at a time, upon establishment of proper credit and each selection of the product in the associated pair until the second column is empty, followed by the automatic transfer of dispensing control back to the first column of the pair so that the remaining product units in the first column may be completely dispensed. In this manner, the possibility of staleness of certain products stored in the two associated columns is minimized by reducing the time during which any of the product units remain stored in the machine prior to selection and subsequent dispensing to customers.

By the present invention, field conversion or modification of existing vending equipment may be readily effected to minimize the aforesaid stock rotation problem. Whether fabricating a completely new unit or modifying an existing unit, it is only necessary to eliminate one customer operated selector switch from the vending cycle lockout circuit covered by the aforementioned U.S. Pat. No. 3,486,601 while interconnecting in the control circuit for a pair of adjacent columns, a product level sensing or depletion switch mounted in close association with one of the columns to thereby place the pair of product columns under direct control of a single selector switch. The product depletion or product level sensing switch is essentially the only added control element connected in the control circuit and is connected in series with the selector switch which initiates vending from the two columns. The product level sensing switch is actuated in either of two positions, depending on the level of products in the associated column. One position enables energization of the article delivery means for the first column of the associated pair and the second position enables energization of the article delivery means for the second column of the associated pair. Thus, the product level sensing switch is connected in series with the common selector switch for the two columns in such a way that the required alternate dispensing from the two columns is effected at the required times to minimize staleness of the product units, without interfering with the normal operation of the vending cycle lockout circuit embodied in U.S. Pat. No. 3,486,601.

The invention is particularly applicable to vending machines having a plurality of storage columns and is illustrated in conjunction with a double depth serpentine column, adapted for sequential dispensing of articles, but it is in no sense limited to machines of this type and may be used on vending machines of a different configuration such as, for example, the single depth serpentine column configuration described in U.S. Pat. No. 3,507,419 to Lindsey et al., in which case two columns, preferably adjacent, would have their control circuits interconnected for conjoint operation of the columns.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a partly diagrammatic cross section view through a double depth serpentine storage column of a vending machine embodying the invention; and

FIG. 2 is a schematic view of an electrical control circuit embodied in the invention.

DETAILED DESCRIPTION

The invention herein may be embodied as a modification to the vending cycle control circuits of U.S. Pat. No. 3,349,881; 3,486,601 and 3,613,854. Since the basic operation of these circuits remain unchanged, in connection with establishment of credit, vend selection and product selection, the entire subject matter of U.S. Pat. No. 3,349,881; 3,486,601, and 3,613,854 is incorporated herein by reference.

With reference to U.S. Pat. No. 3,486,601, it should be apparent that the present invention is illustrated as a modification to the control circuit illustrated therein. As noted in that patent, the lockout control circuit is illustrated in connection with a vending machine having four columns or stacks of product units, while in the present application the control circuit is illustrated in connection with a six column vending machine. The number of columns is dependent on the physical configuration of the machine and the basic mode of operation of the circuit, except for the improvement, remains substantially identical with the operation of the prior patented circuit illustrated in U. S. Pat. No. 3,486,601. Therefore a complete detailed description of the circuit in this application is unnecessary for a proper understanding of the invention.

For convenience, the reference characters employed herein to describe the invention in connection with FIG. 2 are made similar to the corresponding reference characters employed in the description of the lockout control circuit in U.S. Pat. No. 3,486,601. More particularly, each column of the vending machine has associated therewith an article delivery means in the form of a solenoid or a vend motor **10**, a timer switch **11**, a pair of soldout switches **12** and **13**, a soldout indicator light **14**, a selector switch **15** and a selector relay **16**. Those components of the circuit in FIG. 2 designated by a numerical character followed by an alphabetical character are disposed for operation with respect to the particular alphabetically designated column of the vending machine to effect dispensing of an article therefrom according to the choice of a customer exactly as described in U.S. Pat. No. 3,486,601. However, in the present invention, as will be completely described, one of the selector switches **15** has been eliminated from the circuit and a product level or column depletion sensing switch **22** has been added and interconnected to the circuit in such a way that the two columns A and B of the machine are electrically connected to function as a single column under control of the one common selector switch **15A–B**.

In addition to the components associated with a particular column, a number of common control components are provided in the circuit including a coin operated vend switch **17**, vend relay **18**, coin reject electromagnet **19**, select indicator or established credit light **20** and credit release relay **21**. Power to the circuit is applied across a pair of supply conductors **24** and **25** which may be connected to a conventional supply source (not shown). The positive (+) terminal of power line **24** designates the "hot" line, while the negative (−) terminal of line **25** designates the ground return line.

The operation of the lockout circuit as described in U.S. Pat. No. 3,486,601 for removing established credit by operation of the credit release relay **21** and associated elements remains unchanged in the present invention and therefore need not be described in detail herein but can be readily understood by reference to the noted prior patent.

For convenience, a brief summary of a typical sequence of operation of the vending cycle lockout circuit is set forth as follows. Upon insertion of the proper coinage into the vending machine, coin operated vend switch **17** is momentarily actuated and vend relay **18** is energized. Select indicator light **20** is illuminated to indicate that credit is established. Energization of vend relay **18** establishes a holding circuit for the windings through contacts **32** and **33**, one or more of the soldout switches **13A–13F** and normally closed contacts **55** and **56** of credit release relay **21**. Also, an enabling circuit for the selector relays **16A–16F** is established through contacts **35** and **36** and the normally closed contacts of the selector relay. Energization of vend relay **18** also breaks the energizing circuit for coin reject electromagnet **19** initially maintained through contacts **34** and **33**.

The dispensing machine is now ready for a particular selection to be made by a customer, which selection is effected by operation of a selector switch **15**. It may be mentioned here that the vending machine may store and dispense a variety of products such as, for example, soft drinks, in a variety of flavors. The less popular flavors may be loaded into the columns designated C through F, while the most popular flavor may be loaded into the two columns A and B having a product level sensing switch **22** associated therewith.

Referring to FIG. **1**, the like products are conveniently stored in adjacent serpentine columns A and B each having an article delivery means **24** and **25** located at the bottom of a generally vertical serpentine column of articles. The articles are contained within column defining rails **26**, **27** and **28** forming serpentine tracks disposed within the vending machine cabinet (not shown). Advantageously, the serpentine tracks are disposed one behind the other and overlap, as shown in FIG. **1**, for maximum utilization of the space within the cabinet; however, in many cases, particularly with older style cabinets, double depth serpentine storage is not available and the articles are stored in laterally spaced serpentine or vertical columns. It will be readily appreciated that the form in which the containers are stored forms no part of the subject invention.

Referring again to FIG. **1**, it will be seen that articles move down the column by gravity, rolling at right angles to their long axes and are therefore dispensed in the same posture and roll out to a receiver to be picked up by the purchaser. The article delivery means **24, 25** may be of conventional form as illustrated and described for example in the aforementioned U.S. Pat. No. 3,507,419 to Lindsey et al. Such article delivery means includes spaced fingers **29** and **30** formed and rotating as a unit and mounted at the end of the serpentine track. The fingers **29** and **30** rotate about an axis at right angles to the long axes of the product and are spaced apart less than the diameter of a product. The floor of the end rail is cut away to permit the fingers to rotate upwardly therethrough, the down stack finger **29**

normally being in raised position to raise a pivoted product retaining plate **31** to its retaining position and the associated up stack finger **30** being in lowered position adjacent the rail. A solenoid **10** or motor is disposed adjacent the rail at one side thereof and on the down stack side of the down stack finger. The solenoid is provided with an armature mounted for sliding movement which is in turn connected by a link to rotate the fingers upon energization of the solenoid as described for example in the aforementioned U.S. Pat. No. 3,507,419.

Timing switch **11** is actuated by the armature of the associated solenoid. Where vend motors replace the solenoid the timer switches are advantageously cam actuated by timing cams mounted to the vend motor shaft. Soldout switches **12** are conveniently mounted at the bottom of the serpentine columns and are actuated in response to movement of a soldout switch element (not shown) normally held in alignment with the surface of the rail by weight of the products resting thereon against the action of a bias spring. Reference may be made to the aforementioned Lindsey et al U.S. Pat. No. 3,507,419 for a detailed description of a cam release mechanism **24, 25** shown in FIG. **1.**

Upon deposit of a coin that establishes credit and selection of the desired product, the dispensing solenoid or motor of that column is energized drawing its armature to the right as seen in FIG. **1,** rotating fingers **29** and **30** counterclockwise. Finger **29** moves the product retaining plate **31** freeing the lowermost product in the column which then rolls to its dispensing position. In the meantime, finger **30** has been rotated in front of the next lowermost product in the column preventing movement of the products other than the lowermost or previously freed product. The dispensing solenoid is then deenergized and fingers **29** and **30** are rotated clockwise lifting the can retaining plate **31** to its normal position. The products then move downwardly until the now lowermost product engages and is stopped by the plate **31.** Plate **31** extends over the middle body portion of the can and provides a jam-proof, pilfer-proof stop. The mechanism is now ready for the next vend cycle.

The primary purpose of the switch **22** is to sense the extent of depletion of products **23** from a column so as to enable dispensing control to be switched from one column to the other column when the product in one of these columns is depleted down to a certain level such as the half-way level of that column. Upon actuation of the sensing switch **22,** the enabling circuit for the article delivery means of the first column is opened, while the enabling circuit for the article delivery means of the second column is closed. Dispensing control will then be transferred automatically to the second column of the pair A–B under control of a single selector switch **15A–B.** After such transfer of dispensing control, dispensing from the alternate or second column will take place until that column is completely depleted of the product and, following this, dispensing control will then be transferred back automatically to the first column having the switch **22** and dispensing from that column will continue until full column depletion. By this means, the larger number of most popular flavor drink units in the two columns A–B are prevented from becoming stale because of the stock rotation provided by this invention.

Returning to the general description of operation of the control circuit, first in connection with one of the columns of the machine containing a less popular drink, for example, column C, and assuming that credit has been established and selector switch **15C** is actuated by a customer, a circuit is established for energization of vend solenoid or motor **10C,** as the case may be, and selector relay **16C.** For convenience, the operating circuit will be described in conjunction with a vend motor used as the article delivery means. Selector relay **16C** is now held in with its contacts **46–49** and **47–51** open and with its contacts **46–48** and **47–50** closed so as to connect the energizing winding **52** of credit release relay **21** in series with the return line **25** through the winding of vend motor **10C** and through the now closed, but normally open, contacts **64–65** of time switch **11C** which is actuated by the energized vend motor **10C.**

It should be noted that vend motor **10C,** which was initially energized through selector switch **15C,** is now energized through conductor **42C** and the holding circuit of selector relay **16C** established with the now closed but normally open contacts **46C** and **48C.** Operation of motor **10C** drives its associated timer cam, not shown, forming a part of timer switch **11C,** causing the corresponding contact arm **64C** to be actuated so as to remove power from the line **42C.** The corresponding selector relay is held in, however, by its holding circuit and the motor winding **10C** is connected in series with the energizing winding of the credit release relay **21** through the normally open, now closed, contacts **47–50** of the energized selector relay **16C.**

When the credit release relay **21** energizes, its contacts **55** and **56** are switched to the open position breaking the vend relay holding circuit, and thus removing established credit from the machine. As the vend relay **18** is deenergized the holding circuit for the selector relay **16C** is in turn opened, deenergizing the selector relay. This returns contact arm **47** to its normal position, again completing the power circuit to the vend motor **10C** through contact **51C** and conductor **77C,** causing motor **10C** to drive its cam, not shown, and return contact arm **64** to its initial position. Opening of contacts **47–50** remove, in the meantime, power from the windings **52** of credit release relay **21.** The vend motor has now completed the latter part of its cycle by the connection reestablished through the timer switch **11C.** This typical description of the vending cycle in connection with one column of the vending machine, which is holding a drink of a less popular type, is exactly in accordance with the operation disclosed in U.S. Pat. No. 3,486,601.

In a situation where the customer selects the more popular drink contained in storage columns A and B of the machine, such customer will actuate the selector switch **15A–B** which controls dispensing from these two columns by operation of the vend motors **10A** and **10B** alternately at the proper times. For example, assuming that the two columns A and B are filled to capacity with containers **23** of the most pupular beverage as illustrated in FIG. **1,** and the customer has actuated the selector switch **15A–B,** a circuit is established for energization of the vend motor **10B** and selector relay **16B.** Selector relay **16B** and the related circuit components will now function in exactly the manner described immediately above in connection with column C for dispensing a single beverage unit **23** from the col-

umn B and removing established credit by operation of the credit release relay. However, as repeated selections of the beverage stored in columns A and B are made by customers utilizing the selector switch 15A–B, the product units 23 will continue to be dispensed serially from the column B under control of conventional article delivery means 25 for the column B. When the original contents of the column B become depleted to the level where the feeler element 81 of sensing switch 22 is no longer in contact with a container 23, the movable contact arm 82 of this sensing switch will be caused to separate from fixed contact 83 and engage a second fixed contact 84, FIG. 2, so as to automatically interrupt the enabling circuit to vend motor 10B and establish an enabling circuit through conductor 85 and contacts 86 and 87 of soldout switch 12A and through conductor 68A to the coil of vend motor 10A. Instantly, when this occurs, further dispensing of product units from the column B will be stopped and selective dispensing from column A will begin and will continue in response to repeated customer actuations of the selector switch 15A–B.

In a preferred arrangement, dispensing from column A will be initiated after approximately one-half of the contents of column B have been dispensed and will continue until the contents of this column are fully depleted or sold out and, following this, dispensing control will be transferred back to column B and vend motor 10B (article delivery means 25) by operation of the related soldout switch 12A. More particularly, when the contents of column A are fully depleted or sold out, the movable contact 86 of soldout switch 12A will shift into engagement with stationary contact 88 of this switch and through a conductor 89 connected to the movable contact arm of soldout switch 12B will transfer dispensing control back to the vend motor 10B, whereupon dispensing of product units from the remaining undepleted portion of column B will again begin and will continue until column B is sold out. Sensing switch 22 preferably is located at the half-way level of the column on which it is mounted, but it should be understood that the exact location of the sensing switch on a particular column may be varied.

It will be understood in connection with the operation of sensing switch 22 that the movable contact arm 82 of this switch is adapted to be actuated by feeler 80 which is biased by a spring 79 toward engagement with the products contained within the rails. To this end, a portion of the end rail is cut away to permit the end of the feeler element 80 to rotate into the space normally occupied by a product unit. As long as a product unit 23 is in contact with this element, the movable contact arm 82 will be held against fixed contact 83 as shown in FIG. 2. Feeler 80 is pivoted intermediate its end at 81 to a plate member 78 supported to the outside surface of the rail and is conveniently biased by spring 79 affixed at one end to plate 78 and at its other end to feeler 80. Switch 22 is mounted to plate 78 with its actuator 77 connected to the movable contact arm arranged in the path of feeler 80 so that it is depressed when the products contained within the rail fall below the level of the feeler allowing it to swing inwardly as shown in the drawings.

As previously noted, the invention is also applicable to other types of prior art vending machines and vending machine control circuits in addition to the circuit specifically embodied herein. It should also be understood that the invention could also be applied to a second pair of columns of the same vending machine, as where beverages of two different popular flavors are stored in two columns each of the vending machine.

While the invention has been described with reference to a particular embodiment, changes or modifications may now be suggested to those skilled in the art without departing from the present inventive concept or scope of the subjoined claims.

I claim:

1. In a control circuit for a multi-column vending machine having an article delivery means for each vending column adapted to be energized for consecutive vending of articles stored therein in response to customer selection and actuation of a selection switch, soldout switches for the individual vending columns of the machine adapted to be actuated from a first to a second position in response to comolete depletion of articles within a column, and circuit means including a plurality of customer-operated selector switches electrically connected to the soldout switches, the latter being electrically connected in their first position to the article delivery means of an associated column to disable the enabling circuit for the article delivery means of the associated column upon depletion of articles in the associated column and actuation of the soldout switch for that column, the improvement comprising means for connecting at least a pair of columns for conjoint operation, said means including a sensing switch for sensing the level of products in one of a pair of said machine vending columns connected for conjoint operation, said switch having a first position and a second position, said switch in its first position being electrically connected to the soldout switch for one column of said pair of columns and a single one of said selector switches associated with said pair of columns, and said switch in its second position being electrically connected to the soldout switch for the other column of said pair of columns, whereby said single selector switch controls vending of articles from both columns of said pair, said sensing switch being arranged to respond to the partial depletion of articles in one column of said pair below a predetermined level sensed by the switch and automatically transfer dispensing control to the article delivery means of the other column of said pair, said sensing switch being disposed intermediate the ends of said one of a pair of said machine vending columns.

2. In a control circuit for a multi-column vending machine as set forth in claim 1, wherein said sensing switch includes a pair of stationary contacts and a movable contact, said movable contact and one stationary contact being electrically connected in series with said single selector switch in its actuated position, said movable contact and the other of said stationary contacts being electrically connected in series with said single selector switch in its actuated position when said sensing switch is in its second position.

3. In a control circuit for a multi-column vending machine as set forth in claim 1, wherein said sensing switch includes a movable feeler actuator in contact with articles in said column of the machine with which the sensing switch is associated.

4. A method of vending articles from a multicolumn vending machine having at least a pair of article storage columns connected for conjoint operation comprising

dispensing articles in succession in response to customer selection from one column of said pair, sensing partial depletion of the articles in said one column below a predetermined level intermediate the ends of that column, transferring dispensing control to the second column of said pair and terminating the vending of articles in the first column of the pair when said articles in the first column have been partially depleted below said predetermined level, dispensing articles from the second column in succession until the articles in the second column are entirely depleted in response to customer selection and transferring dispensing control back to the first column of said pair and then causing dispensing of the remaining articles in the first column in response to customer selection until the articles in the first column are entirely depleted while discontinuing vending of articles from the second column of said pair of columns.

5. The method as defined in claim **4,** wherein said dispensing in response to customer selection includes the actuation of a customer selector switch, and said sensing depletion of articles comprises the utilization of a product level sensing switch on one column of said pair of columns near the midpoint of the column.

6. The method of converting a coin operated vending machine having a plurality of individual columns of articles to be selectively dispensed for conjoint operation of at least two of said individual columns, wherein said vending mcahine includes a plurality of article selection switches, one for each column and a plurality of associated article dispensing means, each of which corresponds to a separate column and is connected in an article selection circuit for that column, each said article dispensing means being arranged for selective energization from a primary source of energization to dispense articles consecutively from the corresponding column, one at a time, according to the choice of a customer upon the establishment of proper credit and actuation of an associated selector switch comprising mounting a product level sensing switch intermediate the ends of a column for sensing the level of articles therein, electrically connecting said product level sensing switch in a circuit with one of said selection switches and the article selection circuit for another column of an adjacent pair of said columns, disconnecting the selector switch of the article selection circuit of said other column and connecting said one of said selection switches to control the article dispensing means of said pair of columns for conjoint operation in response to the level of articles intermediate the ends of one of said columns.

7. The method of converting a coin operated vending machine having a plurality of individual columns of articles to be selectively dispensed for conjoint operation of at least two of said individual columns wherein said vending machine includes a plurality of article selection switches, one for each column, and a plurality of article dispensing means, each of which corresponds to a separate column and is connected to an associated selector switch in an article selection circuit for that column, each said article dispensing means being arranged for selective energization from a primary source of energization to dispense articles consecutively from the corresponding column, one at a time, according to the choice of a customer upon the establishment of proper credit and actuation of an associated selector switch, comprising removing one of said article selection switches for one of said two columns to be connected for conjoint operation, mounting a product level sensing switch intermediate the ends of one of said two columns for sensing the level of articles therein and connecting the article selection for the other of said two columns and said product level sensing switch in a separate energizing circuit of the article dispensing means of said two columns such that successive operation of said selector switch in said separate energizing circuit causes consecutive dispensing of articles from said one column until said articles are depleted below the level of the sensing switch and thereafter causes consecutive dispensing of articles from the other of said two columns.

8. The method as defined in claim **7,** and additionally connecting said product level sensing switch in said separate energizing circuit with a pair of soldout switches for the respective individual columns of said two columns whereby in a first position of said product level sensing switch the article dispensing means for one of the columns is activated and the article dispensing means of the other column is deactivated and in a second position of the sensing switch the article dispensing means of said other column is activated and the article dispensing means of said one column is deactivated.

9. In a coin operated vending machine having a plurality of columns of articles to be selectively dispensed, a plurality of article selection switches and a plurality of associated article dispensing means, each of which corresponds to a separate column and is connected in an article selection circuit for that column, each said article dispensing means being arranged for selective energization from a primary source of energization to dispense articles from the corresponding column, one at a time, according to the choice of a customer upon establishment of proper credit and actuation of a selector switch, the improvement comprising switch means operatively connected to control the article dispensing means of at least two columns for conjoint operation, said switch means including a first switch having a first and second position, and a second switch having a first and a second position said second switch being one of the customer operated article selector switches and means for electrically connecting, upon actuation of said second switch to its second position, the article dispensing means of one of the two columns to its primary energizing source when said first switch is in the first position and the article dispensing means of the other of the two columns to its primary energizing source when said first switch in its second position, said first switch being disposed approximately midway between the ends of one of said two columns.

10. In a coin operated vending machine having a plurality of columns of articles to be selectively dispensed, a plurality of associated article dispensing means, and an article selection circuit operatively connected in common to at least a pair of said article dispensing means, each said article dispensing means being arranged for selective energization from a primary source of energization to dispense articles consecutively from the corresponding column, one at a time, according to the choice of a customer upon the establishment of proper credit, the improvement comprising a product level sensing switch disposed intermediate the ends of one of said columns for sensing partial depletion of articles from said one of said columns and having two posi-

tions operatively connected in said article selection circuit to control said pair of article dispensing means for conjoint operation, said product level sensing switch in one position effecting energization of the article dispensing means for one column of said pair and in the second position effecting energization of the article dispensing means for the other column of the pair.

11. The coin operated vending machine as defined in claim **10**, further including a pair of soldout switches for said pair of columns, said product level sensing switch in said first position forming a circuit through one soldout switch to the article delivery means for one column and in said second position forming a circuit through the other soldout switch with the article delivery means for the second column of said pair.

12. The coin operated vending machine as defined in claim **11** wherein said soldout switches each include a first and a second position, each said soldout switch in said first position completing said circuit and in said second position preventing completion of said circuit so as to prevent energization of the article dispensing means in the associated column.

13. The coin operated vending machine as set forth in claim **12** wherein each soldout switch is disposed adjacent a column for sensing depletion of products in the adjacent column and actuating means disposed adjacent each column and operatively connected to the associated soldout switch for actuating said switch from its first to its second position upon depletion of products in that column.

14. The coin operated vending machine as set forth in claim **10** wherein said product level sensing switch is disposed approximately midway between the ends of said one column for sensing the level of products therein and means for actuating said switch from its one position to its second position upon depletion of products below the approximate midway level of said products in the column.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,831,806 Dated August 27, 1974

Inventor(s) James C. Lindsey

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Claim 1, column 8, line 19, "comolete" should be --complete--; and
Claim 6, column 9, line 29, "mcahine" should be --machine--.

Signed and sealed this 17th day of December 1974.

(SEAL)
Attest:

McCOY M. GIBSON JR.
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents